

Observations on the feeding biology and population ecology of the Grey Parrot *Psittacus erithacus*

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Grey Parrots *Psittacus erithacus* are widely distributed across west and central Africa, occurring from sea level up to 2200 m (Fry *et al.* 1988). They occur in a variety of habitats including primary and secondary lowland rain forest, montane forests, and wooded savannas, where they feed primarily on fruits and seeds (Fry *et al.* 1988). Despite their wide distribution and popularity in the pet trade, our understanding of many aspects of the behaviour and ecology of natural populations is limited. Within Uganda and much of East Africa, deforestation is threatening the status of the Grey Parrot populations (D. Pomeroy, pers. comm., Dowsett 1985, Stuart 1985).

There are a number of factors contributing to the paucity of data on this species and parrots in general (Snyder *et al.* 1987, Lindsey *et al.* 1991). The forest environments inhabited by these parrots are difficult to census, because it is often not possible to observe the canopy or see through it to identify flying birds. Feeding parrots are cryptic and hard to observe, increasing the difficulty of obtaining accurate counts. Furthermore, flocks are continuously intermixing, increasing the problem of characterizing an independent sighting in census work. Finally, these parrots are thought to travel long distances, tracking fruit resources which become locally available. Thus, accurate estimates of population size require censuses that cover a very large area over a short period of time.

This paper presents observations on the feeding biology and numbers of Grey Parrots in the Kibale Forest Reserve in western Uganda. In this forest, Grey Parrots have, in general, been observed only intermittently for a few days at a time. However, from July to September 1991, large numbers were observed repeatedly over a ten-week period during which they fed heavily on a large seed crop of *Pseudospondias microcarpa*. We report on observations made during the fruiting period of this tree species.

Methods

Observations were made in Kibale Forest Reserve, western Uganda (0°13–0°41N and 30°19–30°32E) at 1500 m, near the base of the Rwenzori Mountains. The reserve is a moist evergreen forest, transitional between lowland rain forest and montane forest (Wing & Buss 1970, Struhsaker 1975, Skorupa 1988). About 60 per cent of the reserve is characterized by tall forest with the canopy generally between 25–30 m high, although some trees exceed 55 m (Butynski 1990). The remainder of the reserve is comprised of a mosaic of swamp, grassland, thicket, and colonizing forest (Wing & Buss 1970, Butynski 1990). Throughout the study area (Kanyawara) trees such as *Diospyros abyssinica* (12.3 per cent of 2111 enumerated trees > 10 cm DBH (diameter at breast height)), *Markhamia platycalyx* (11.8 per cent), *Celtis durandii* (10.9 per cent), *Uvariopsis congensis* (9.8 per cent), and *Bosqueia phoberos* (8.7 per cent) are common (Chapman *et al.* in prep.). Observations of parrots were made between September 1987 and October 1991. However, the majority of the observations reported here centre on the peak of the *P. microcarpa* fruiting in August 1991 already mentioned.

During the period of study, parrots were seen intermittently, and it was not

uncommon for two to three months to pass without a single sighting. However, in August 1991 large flocks appeared in the area. Their appearance coincided with the production of a large fruit crop of *P. microcarpa*. The repeated occurrence of Grey Parrots in the same grove of these trees facilitated careful observations of their foraging behaviour and estimates of foraging flock size. Grey Parrot use of focal *P. microcarpa* trees was carefully quantified. To estimate the size of the entire flock using the *P. microcarpa* grove, we combined these data with casual observations of parrots in other trees and quantification of the number and size of all *P. microcarpa* trees in the area.

Observations of *P. microcarpa* focal trees were started on 11 July 1991 before any animals started feeding on this species' fruits, and ended on 25 September after frugivores ceased visiting. The focal *P. microcarpa* trees were observed on 59 d for an average of 4.82 h d⁻¹ (± 1.8 h, s.d., range = 1.1–10.7 h) producing a total of 285 h of observations. An attempt was made to spread observations throughout the daylight hours. During the period of parrot use (Fig. 1), one focal tree was observed every day, except on 12 August when the observers were unable to watch the tree (the number of parrots in the tree for this day was expressed as the average of the preceding and following day). The number of parrots in the focal tree and the number of birds that were feeding were determined every 15 min.

Fruiting *P. microcarpa* trees occurred primarily in a 1-km² grove located in the southern section of the K30 forestry compartment (Struhsaker 1975, Skorupa 1988). To determine the density of *P. microcarpa* trees, this whole area was repeatedly searched for fruiting individuals. All fruiting trees found were individually numbered with aluminium tags, and their diameter at breast height was measured (DBH). DBH is a measure which has been shown to reflect the ability of a tree to produce fruit (Chapman *et al.* in prep.). To understand the responses of the Grey Parrots to changes in the relative abundance of *P. microcarpa* fruit, 20 trees were randomly selected from the list of all numbered trees. On the first day of each week between 17 July and 25 September, these trees were visited and the abundance of fruit in each was estimated and given a ranking between 0 and 4. To calculate the relative amount of fruit available to the parrots in a given week, we summed the product of the DBH and the Fruit Abundance Score for all 20 trees.

We estimated the number of parrots using the area during the peak of *P. microcarpa* fruiting (8–17 August, Fig. 1) by extrapolating from the observations and calculating the proportion of the day that parrots were using the focal tree. This value was then multiplied by the average parrot flock size obtained from the focal tree observations and the number of fruiting *P. microcarpa* trees known to be fruiting in the area. The DBH of the focal tree observed during this period of peak parrot abundance was close to the average for the *P. microcarpa* grove (focal tree DBH = 220 cm; average for the grove = 180 cm, range = 60–300 cm). Thus, we did not compensate for differences in the size of the individual trees within the grove. Using these calculations to estimate parrot numbers assumes that when parrots were not in the focal *P. microcarpa* tree, they were feeding in another tree of the same species, and that the parrots were equally spread through the different trees. We believe the estimate obtained is a conservative one, since counting feeding parrots is difficult. In addition, some *P. microcarpa* trees may not have been found in our survey, and parrots may have been using other fruit or seed resources during the period of study.

As part of a large scale study to understand the interaction between fruiting trees and

frugivores in the Kibale Forest, we conducted a census of vertebrates along 26 randomly placed 100-m long transects in the study area. These censuses were initiated in May 1990 and continued on a monthly basis throughout the observation period. All vertebrates seen in trees with trunks within 5 m of each side of the transects were identified, and the tree that they were in was recorded. These data were used to assess seasonal visitation of Grey Parrots to the study area.

Results and discussion

Grey Parrots first fed in the focal tree on 29 July, 18 d after observations began. They continued to use the tree until 22 August, but peak used centred on 12 August (Fig. 1). After 22 August, parrots were not seen in the tree, and observations throughout the area suggested that they had left the grove.

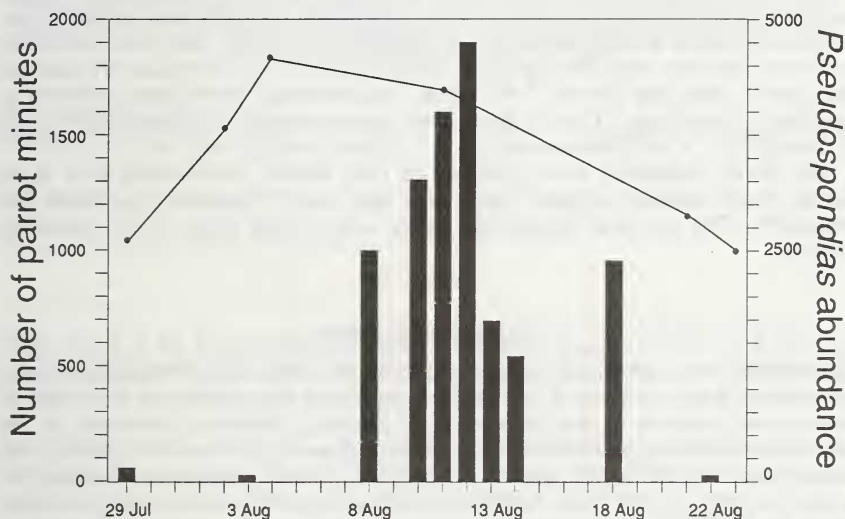


Figure 1. The number of Grey Parrot minutes per 12-h day (number of parrots \times the length of time they were in the focal *Pseudospondias microcarpa* tree), relative to the estimated abundance of *P. microcarpa* fruit (sum of DBH \times Fruit Abundance Rank) in the Kibale Forest Reserve, Uganda

During the 10 d that parrots were seen in the focal tree, they spent an average of 48.9 min in the tree each day. The amount of time spent in the focal tree increased during the period of peak use (8–17 August) to 55.5 min. During these days, the composition of the flock in the tree was frequently changing as flocks of various sizes or single individuals arrived and departed. Parrots were often spread out through a number of trees, but were in vocal communication, for parrots would often call back and forth between adjacent trees. When Grey Parrots were in the focal tree, the flock size averaged 3.8 (\pm 2.6, s.d.) and ranged between 1 and 10. During the period of peak use the size of the flocks increased only slightly to 3.9 (\pm 2.6, s.d., range 1–10). During

this period of peak use, the size of the Grey Parrot population using the area was estimated to be approximately 95 birds.

Prior to the fruiting of *P. microcarpa*, Grey Parrots were never seen in trees during 14 months of vertebrate censuses conducted at Kanyawara. However, they were occasionally seen flying over the study area.

The presence of parrots in the study area corresponded closely to the period where *P. microcarpa* fruit was available. However, the peak of parrot feeding in the focal tree appeared to be slightly after the peak availability of *P. microcarpa* fruit (Fig. 1). It may be that the focal tree had its peak in fruit abundance after the majority of the trees in the local population. However, it seems more likely that the parrots were tracking the availability of this fruit, but that the sampling of their entire range for new fruit crops may take some time, resulting in the occasional delay in recruitment to new fruiting trees.

The parrots expertly peeled off some of the flesh of the fruit, cut through the thick seed coat, and consumed the embryo of the seed. Thus, the seeds manipulated by the parrots were killed and the parrots were acting as seed predators. They were never seen to carry seeds away from the canopy of the parent tree, but would frequently pick and drop seeds under the crown of the parent. An individual parrot was estimated to consume $5.2 \text{ seeds min}^{-1}$. Thus, in the focal tree they consumed an estimated 9917 seeds ($5.2 \text{ seeds min}^{-1} \times 48.9 \text{ min average stay} \times 3.9 \text{ birds (average flock size)} \times 10 \text{ d}$).

The sudden appearance of an estimated 95 Grey Parrots, not normally seen in the Kibale Forest Reserve, suggests that a very large area is required to maintain this population. This has clear implications for the conservation needs of this species in Uganda.

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Errata

First record of the Black-billed [*sic*] Seed-cracker *Pyrenestes ostrinus* in Kenya by Terry Stevenson. *Scopus* 15: 133–134: the English name was given incorrectly throughout; it should be Black-bellied Seed-cracker.

Birds of the main university campus in Dar es Salaam, Tanzania: a ringing study by Charles Mlingwa. *Scopus* 16: 50–54: p. 52, Orange Weaver *Ploceus aurantius* should have been Golden Weaver *Ploceus subaureus*.

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